Name ____________________ Student Number ____________________

All solutions are to be presented on the paper in the space provided. The quiz is open book. You can discuss the problem with others and ask the TA questions.

(1) Differentiate the following:

(a) $f(x) = \tan x$. $f'(x) = \sec^2 x$.

(b) $f(x) = \sec x$. $f'(x) = \sec x \tan x$.

(c) $f(x) = \cos^{-1} x$. $f'(x) = \dfrac{-1}{\sqrt{1 - x^2}}$

(d) $f(x) = \pi^x$. $f'(x) = \pi^x \ln \pi$.

(e) $f(x) = x^\pi$. $f'(x) = \pi x^{\pi - 1}$.

Over→

(f) $f(x) = \cos(\sin(x))$. $f'(x) = -\sin(\sin x)\cos x$.

(g) $f(x) = \dfrac{\sec^{-1}(x^2)}{\sec(x^2)}$.

$$\begin{aligned} f'(x) &= \frac{\frac{d}{dx}\sec^{-1}(x^2)\sec(x^2) - \sec^{-1}(x^2)2x\sec(x^2)\tan(x^2)}{\sec^2(x^2)} \\ &= \frac{\frac{1}{x^2\sqrt{x^4-1}}2x\sec(x^2) - \sec^{-1}(x^2)2x\sec(x^2)\tan(x^2)}{\sec^2(x^2)} \end{aligned}$$

(h) $2^x e^{\sin(x)}$. $f'(x) = 2^x \ln 2 e^{\sin(x)} + 2^x e^{\sin(x)}\cos(x)$.

(2) Find y' for the curve given by $\sin(x+y) = e^{x^2+y^2}$.

$$\cos(x+y)(1+y') = e^{x^2+y^2}(2x+2yy')$$

$$y' = \frac{2xe^{x^2+y^2} - \cos(x+y)}{\cos(x+y) - 2ye^{x^2+y^2}}$$

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